UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,673	11/25/2003	Adolf Gunther	4070-70	7250

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EXAMINER
SMITH, JEFFREY S

ART UNIT	PAPER NUMBER
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

Office Action Summary	Application No.	Applicant(s)
	10/722,673	GUNTHER ET AL.
	Examiner	Art Unit
	Jeffrey S. Smith	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>25 November 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-18</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-18</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>27 May 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

The co-inventors Erik Borg and Bernd Fichtelmann have not signed the declaration. The oath or declaration is defective because it was not executed in accordance with either 37 CFR 1.66 or 1.68. An executed oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 7, the meaning of "the gray-scale values enter into the final gray-scale value in correspondence with a percentage of areas of all image elements lying within the polygon" is unclear. Also, "the gray-scale values" lacks antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-6, 8-9, 13-14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Number 5,864,632 issued to Ogawa et al. ("Ogawa").

For claim 1, Ogawa discloses extracting at least three objects (O1-O3) from the image (O) (a road, a building, a field and woods are recognized, see column 6 lines 30-38 and Fig. 7);

determining at least three control points in the image, such that characteristic object points of the extracted objects are determined as control points (characteristic points of the shape contour lines of the recognized objects are extracted as control points 704, see col. 6 lines 30-33 and 36-38 and Fig. 7);

assigning the objects (O1-O3) to objects (O1'-O3') in the reference image, such that assignment is made according to similarity between the corresponding objects in the two images (col. 7 lines 60-65 and Fig. 11, the position of road 1101 in the image is matched to the position of road 1100 in the map, and the position of the building 1103 in the image is correlated with building 1102 in the map. See also col. 8 lines 53-65) and/or on the basis of a vector grid formed by the connections between the characteristic object points (see Fig. 11(b) and col. 8 lines 11-18, the ground control points form a grid that is matched to a grid formed by map reference points); and

selecting one of a suitable mapping function (eq. 4 in col. 8 line 47) and adjusting parameters of the mapping function (map transform coefficients are determined and used to adjust values of reference coordinate points, see Fig. 12), whereby the mapping

function is changed by changing the parameters (reference points) in such a way that cumulative error in the positional differences between the control points and corresponding points in the reference image is minimized (the reference points are adjusted until the transformation deviation is minimized, see col. 7 lines 56-65, col. 9 lines 12-14, and Fig. 13).

For claim 9, the claimed extraction module, control point determination module, object assignment module and selection module are interpreted as software code that, when executed on a computer, performs the method of claim 1. This software is disclosed by Ogawa at column 12 line 63-column 13 line 30 and shown in Fig. 22.

For claims 5 and 13, Ogawa discloses performing a compensating calculation using a correction function, wherein, for at least two control points, at least one vertical and one horizontal correction value is determined (see col. 8 lines 39-40, u' and v' are horizontal and vertical correction values), said correction values correcting for positional difference between a projected control point and the a corresponding control point in the reference image, and wherein the correction function is determined as a function of the correction values (see Fig. 12 and col. 8 lines 38-47, the correction values are used to determine the correction function (collation deviation) shown in eq. 4 at line 47, which is used to compensate for the position deviation as discussed in col. 9 lines 12-14).

For claims 6 and 14, Ogawa discloses projecting corner coordinates of an image

element onto image positions, wherein image positions of the corner coordinates are

determined from the mapping function and the correction function (see Fig. 18(a) and

col. 11 lines 3-13).

For claims 8 and 16, Ogawa discloses said step of extracting comprises

performing at least one of a classification and a geometric structure analysis, said

process further comprising: analyzing the properties of the image and forming at least

one of objects and areas of like classifications if classification is performed (see col. 6

lines 33-38 analyzing properties such as color and shape); and if the geometric

structure analysis is performed, determining an edge contour of an object from contours

of an area, and numerically characterizing objects are by a structure index (see column

6 lines 45-54, extracting points from shape contour lines and using the points to

numerically characterize the shape as shown in Fig. 8 by element 803).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-4, 7, 10-12, 15 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa in view of U.S. Patent No. 5,550,937 issued to Bell et al. ("Bell").

For claim 2, Ogawa discloses the elements of base claim 1.

Bell discloses generating weighted control points for forming a control point structure (neighborhood 51-1 shown in Fig. 6), comprising a limited number of pixels (see col. 7 lines 60-61, 64-512 pixels) around a control point (see col. 7 lines 45-49 and matching point MP in the center of neighborhood 51 in Fig. 6) of at least one of the image and the reference image (image 21B or 22B of Fig. 6); and

projecting the control point structure using the mapping function onto the other image serving as the image structure (see fig. 7, projecting the control point structure of 21B onto the image structure 31) for determining whether there is also a corresponding image structure of sufficient quality wherein the quality of the control point structure is measured by at least one of its variability, directional contrast, and/or similarity, and a weighting of the control points on the basis of said control point structure quality (the degree of coregistration to a corresponding image structure is a quality measure that is determined by similarity or contrast, see column 8 lines 6-34).

It would have been obvious to one of ordinary skill in this art at the time of invention to modify the correlation device of Ogawa to include the weighted control points of Bell for the advantage of being able to collate images derived from diverse types of image collection devices, as taught by Bell at column 1 lines 59-66.

For claim 10, Ogawa discloses the elements of base claim 9. Bell discloses a module for generating weighted control points as shown in figures 5 and 6 in light of column 5 lines 27-42.

For claims 3 and 11, Bell discloses adjusting a position of the control point in at least one of the image and the reference image (see matching points of Fig. 6);

adjusting, for at least one channel, a control point structure gray-scale value distribution form in the reference image, and a control point structure gray-scale value distribution form of the image structure in the image to each other (Figure 7 and column 8 lines 23-31, gray-scale values such as brightness and contrast are adjusted by an edge content preemphasis operation);

determining, in at least one of the image and the reference image, whether there is at least one first difference between the gray-scale values of two adjacent pixels of the control point structure and at least one second difference between gray-scale values of corresponding pixels in the image structure (figure 8 and lines 36-56, the pixel-to-pixel edge transitions are enhanced so that they can be cross-correlated with the other image);

determining an error value from a difference between said first and second differences (Figure 8 and column 7 lines 27-29, the edge content is used to determine misalignment of the two images);

mapping a less-resolved image structure component onto a more resolved image

structure component (column 7 lines 50-59, the number of pixels in the neighborhood of

the second image is larger than that of the first image); and

shifting the control point structure in at least one of the image and the reference

image in at least one of a vertical and a horizontal direction to determine a new position

error (column 8 lines 48-56, the neighborhood (control point structure) is shifted).

For claims 4 and 12, Bell discloses adjusting at least one of individual

parameters of the mapping function and a selection of a suitable mapping function, such

that a change of the mapping function is made by said adjusting in such a way that a

cumulative error of positional differences between projected control points and

corresponding weighted control points in the reference image is minimized (see the

selection of one of several cross-correlation mapping functions such as FFT, Parametric

Hill Finder, and Least Squares at columns 9-12).

For claims 7, 15 and 17-18, Bell discloses performing a resampling (see column

8 lines 6-12), wherein corner coordinates describe a polygon (see neighborhoods 51-x

in Fig. 6), and the gray-scale values enter into the final gray-scale value in

correspondence with a percentage of areas of all image elements lying within the

polygon (see column 7 lines 23-34).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSS
January 17, 2007

JINGGE WU
SUPERVISORY PATENT EXAMINER